

Claims

1. (Original) An apparatus for the continuous formation of composites comprising a mixture of filler and thermoactive materials, the apparatus comprising a conveyor for conveying a continuous charge of the mixture, and a hot-gas distribution system having at least one pair of gas cells positioned along the conveyor for applying hot gas to the charge, wherein a first cell of the pair applies hot gas to one side of the charge and wherein a second cell of the pair operates at a pressure less than that of the first cell, thereby creating a pressure differential across the charge, the second cell receiving gas expelled by the first cell.
2. (Original) The apparatus according to claim 1 having plural paired gas cells.
3. (Original) The apparatus according to claim 1 wherein the gas cells are rollers.
4. (Original) The apparatus according to claim 1 wherein the gas cells are stationary.
5. (Original) The apparatus according to claim 1 and further including a mixer for forming the mixture comprising filler material and thermoactive material and for providing a continuous charge of the mixture to the conveyor.
6. (Original) The apparatus according to claim 5 wherein the mixer includes a hot-gas inlet for receiving hot gas from a source for heating the filler material and the thermoactive material.
7. (Original) The apparatus according to claim 5 wherein the mixer comprises a cyclone mixer.
8. (Original) The apparatus according to claim 1 and further comprising baffles positioned adjacent the gas cells.

9. (Original) The apparatus according to claim 2 and further comprising baffles positioned adjacent at least one of the gas cells.

10. (Original) The apparatus according to claim 1 and further comprising shrouds positioned to substantially surround the gas cells.

11. (Original) The apparatus according to claim 2 and further comprising shrouds positioned to substantially surround at least one of the pairs of gas cells.

12. (Original) The apparatus according to claim 1 wherein the hot-gas distribution system comprises multiple pairs of cells, including cells for applying a densifying force to the charge, and wherein the pairs of cells are fluidly interconnected in series with a gas application cell of one pair connected to a suction or evacuation cell of same pair, with the suction or evacuation cell of one pair connected in series to press cell of another pair.

13. (Original) The apparatus according to claim 1 wherein such apparatus provides pulsed hot gas application to charge as charge moves between pairs of cells.

14. (Original) The apparatus according to claim 1 wherein the gas flows in a direction opposite to direction of charge movement through the consolidation zone.

15. (Original) The apparatus according to claim 1 wherein the gas flows in the same direction of charge movement through the consolidation zone.

16. (Original) The apparatus according to claim 1 wherein each cell is a drum-type roller.

17. (Original) The apparatus according to claim 16 wherein the rollers include central stationary gas application or recovery portion.

18. (Original) An apparatus for the continuous formation of composites comprising a mixture of filler and thermoactive materials, the apparatus comprising:

a conveyor for continuously moving a charge through a consolidation zone;

pairs of gas cells positioned on opposite sides of the charge, one cell of the each pair for injecting hot gas into the charge, the other cell of each pair for drawing gas through the moving charge.

19. (Original) The apparatus according to claim 18 further comprising multiple pairs of cells.

20. (Original) The apparatus according to claim 19 wherein the multiple cells are fluidly interconnected.

21. (Original) The apparatus according to claim 19 wherein the multiple cells are interconnected in series.

22. (Original) The apparatus according to claim 19 wherein the multiple cells are interconnected in parallel.

23. (Original) The apparatus according to claim 18 wherein the gas flow direction is opposite to charge moving direction.

24. (Original) The apparatus according to claim 18 wherein the gas flow direction is the same as charge moving direction.

25. (Original) The apparatus according to claim 18 wherein the cells deliver pulses of hot gas to the moving charge.

26-31 (Canceled).

32. (Original) A system for continuously forming a composite that includes thermoactive material and filler material, comprising:

a mixer for forming a mixture comprising filler material and thermoactive material;

a continuous consolidation apparatus for applying hot-gas to a charge, the apparatus comprising plural paired gas cells wherein a first cell of each pair applies gas to one major surface of a charge and wherein a second cell of each pair operates at a pressure less than that of the first cell, thereby creating a pressure differential across the charge, the second cell receiving gas passing through the charge; and

a densifying apparatus for applying a densifying pressure to the charge.

33. (Original) The system according to claim 32 and further including a mat-forming apparatus upstream of the consolidation apparatus.

B 34. (Original) The system according to claim 32 and further comprising a densifying apparatus upstream of the consolidation apparatus.

35. (Original) The system according to claim 32 wherein the densifying apparatus comprises the cells.

36. (Original) The apparatus according to claim 32 wherein the densifying apparatus comprises pressure cells for applying a densifying pressure to the charge.

37. (Original) The system according to claim 32 wherein the gas cells and densifying cells are the same cells.

38. (Original) The system according to claim 32 and further comprising densifying cells downstream of the gas cells.

39. (Original) The apparatus according to claim 32 wherein the densifying apparatus operates continuously.

40. (Original) The apparatus according to claim 32 wherein the densifying apparatus operates batchwise.

41. (Original) The apparatus according to claim 32 wherein the gas cells comprise press cells.

42. (Original) The apparatus according to claim 32 comprising press cells downstream of the gas cells.

43. (Original) The apparatus according to claim 32 for continuously consolidating and densifying the charge by applying pressure to the charge as it moves through the consolidation zone while simultaneously applying pressure to the charge.

44. (Original) The apparatus according to claim 32 further comprising a densifying apparatus upstream of the consolidation zone.

45. (Original) A system for making composites comprising at least one thermoactive material and at least one filler material, the system comprising:

a cyclone for forming mixtures comprising thermoactive and filler materials;

a mat-forming apparatus for forming mats from the mixture;

a continuous consolidation apparatus for receiving the mat, the consolidation apparatus having a hot-gas distribution system comprising plural paired rollers wherein a first roller of each pair applies gas to a charge and wherein a second roller of each pair operates at a pressure less than ambient; and

a densifying apparatus for applying a densifying pressure to the charge downstream of the consolidation apparatus.

46-72 (Canceled).

73. (Previously presented) The apparatus according to claim 1 and further comprising a surface modifier for surface modifying at least a portion of a surface of the composite.

74. (Previously presented) The apparatus according to claim 73 where the surface modifying apparatus operates by flame oxidation, corona oxidation, e-beam, photoactivation, and combinations thereof.

75. (Previously presented) The method according to claim 47 where continuously consolidating forms a composite, and the method further comprises surface modifying at least a portion of a surface of the composite.

76. (Previously presented) The method according to claim 75 where surface modifying comprises oxidizing at least a portion of the surface, applying an electron beam to at least a portion of the surface, phototactivating at least a portion of the surface, and combinations thereof.

77. (Previously presented) The method according to claim 76 and further comprising applying grafting chemicals to at least a portion of the surface.
